

REMARKS

The Office Action of February 6, 2007, has been received and reviewed.

Claims 1-12, 15, 16, 18-21, 23, and 25-34 are currently pending and under consideration in the above-referenced application. Claims 2 and 5-10 have been canceled without prejudice or disclaimer. Claims 15, 16, 18-20, 23, 25-27, and 33 are allowed. Each of claims 1, 3, 4, 11, 12, 21, 28-32, and 34 stands rejected.

Reconsideration of the above-referenced application is respectfully requested.

35 U.S.C. § 112 Claim Rejections

Claims 1, 3, 4, 11, 12, and 21 are rejected under 35 U.S.C. § 112, first paragraph, because one of ordinary skill in the art purportedly would not know how to use the claimed spacers. Applicants respectfully traverse this rejection, as hereinafter set forth.

Specifically, the Office Action asserts that “[A]pplicants fail to disclose how a single material layer can substantially (i.e., approximately) fill at least one recess, while at the same time having a thickness of less than about half a depth of said at least one recess.” *See* Office Action, pages 4-5. However, claim 1 does not recite that the material layer within the recess has a thickness of half the depth of the recess. Rather, claim 1 recites “portions of the material layer that cover a surface of the substrate having a thickness of less than about half the depth of the at least one recess.” FIGs. 2 and 5 of the as-filed specification depict embodiments of material layers 18 and 28 that both substantially fill trenches 14 and 24 and, on the surface of the substrate, have thicknesses T and T’ less than about half the depths D and D’ of trenches 14 and 24. *See also*, the as-filed Specification, paragraphs [0011], [0013], [0039], and [0043], which describe one embodiment in which the material is a mask material.

As such, it is respectfully submitted that independent claim 1 complies with the enablement requirement of the first paragraph of 35 U.S.C. § 112.

Each of claims 3, 4, 11, 12, and 21 is allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Claims 28-32, and 34 stand rejected under 35 U.S.C. § 112, first paragraph, for containing subject matter which was not described in the specification in such a way as to

reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding the rejection of claims 28-32, claim 28 has been amended to recite a semiconductor device structure that includes a substrate with at least one recess formed therein, an intermediate layer filling a portion of the at least one recess and a material layer disposed over the intermediate layer and substantially filling a remaining portion of the at least one recess, the material layer having a substantially planar surface, the material layer covering a surface of the intermediate layer having a thickness of less than about half a depth of the remaining portion of the at least one recess. Support for this amendment may be found in the as-filed specification at FIG. 2 and paragraph [0039]. Thus, it is respectfully submitted that independent claim 28, as amended herein, complies with the written description requirement of the first paragraph of 35 U.S.C. § 112.

Claims 29-32 are each allowable, among other reasons, for depending either directly or indirectly from claim 28, which is allowable.

Regarding claim 34, it is respectfully submitted that the as-filed specification provides support for the recitation of at least one valley forming a remaining portion of at least one recess. Specifically, FIG. 1 of the as-filed specification shows an embodiment in which a valley lies both partially in and substantially above a recess. As such, it is respectfully submitted that claim 34 complies with the written description requirement of the first paragraph of 35 U.S.C. § 112.

Claim 34 has also been rejected under 35 U.S.C. § 112, second paragraph, for reciting subject matter that is purportedly indefinite.

The Office Action asserts “one having skill in the art could make no sense out of a claim which characterized something as simultaneously being ‘substantially above,’ and ‘partially in,’ the same recess.” *See* Office Action, page 6. Referring again to FIG. 1 of the as-filed drawings, a stacked capacitor structure 10 is depicted with a valley that is located both substantially above and partially in an underlying recess. It is respectfully submitted that one of ordinary skill in the art would readily understand that a valley could be located both “substantially above” and “partially in” and underlying recess.

Thus, the rejection of claim 34 based on the indefiniteness requirement of the second paragraph of 35 U.S.C. § 112 should be withdrawn.

Rejections under 35 U.S.C. § 102

Claims 1, 3, 11, 12, and 21 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 6,278,153 to Kikuchi et al. (hereinafter “Kikuchi”).

A claim is anticipated only if each and every element, as set forth in the claim, is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Kikuchi describes an intermediate semiconductor device structure in which a layer of resist 20 has been disposed within and over a via-hole 23a. Kikuchi also discloses that the resist 20 can be applied by several conventional methods, including spin-coating. Col. 17, lines 63-66. While resist 20 *appears* in Fig. 6D of Kikuchi to have a planar surface, Kikuchi lacks any express or inherent description that the surface of resist 20 is planar.

It is respectfully submitted that Kikuchi does not expressly or inherently describe a material covering the surface and filling a recess in the semiconductor device with a substantially planar upper surface. Rather, the description of Kikuchi is limited to figures showing a resist 20 that appears to have a thickness of less than about half a depth of the via-hole 23a. It is respectfully submitted that Kikuchi, lacks any express description that the surface of resist 20 shown in FIGs. 6D, 10C or 13D is planar. A high standard has been set for reliance on drawings in prior art rejections. Specifically, “[I]t is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” *See* M.P.E.P. § 2125. In view of the warning that has been provided by M.P.E.P. § 2125 with respect to reliance upon the drawings of a patent, and without further guidance from the specification of Kikuchi, the mere inclusion of a straight

line to depict the surface of resist 20 does not adequately indicate that surfaces represented by the straight lines are substantially planar.

Moreover, Kikuchi describes that layers of resist may be spin-coated onto semiconductor substrates that include recesses. As is well known in the art, conventional spin-coating processes result in resist layers which have substantially uniform thicknesses; a teaching which is not contradicted by Kikuchi. It is not possible for a layer which has a substantially uniform thickness and which is formed over a nonplanar surface to have a planar surface.

Moreover, Kikuchi does not expressly or inherently describe a material layer that covers a surface of the substrate having a thickness of less than about half a depth of the at least one recess. Rather, Kikuchi depicts a thin film capacitor with a resist 20 formed over a dielectric layer 24 and electrically conductive layers 25, 26 and 27 in a portion of a via-hole 23a. However, Because Kikuchi does not expressly describe that the resist 20 shown in FIG. 6D has a thickness of less than about half the depth of the via-hole 23a, the drawings cannot be relied upon to define the precise proportions of the resist 20. Thus, the drawings of Kikuchi are merely simplified representations that cannot be relied upon to support the assertion that Kikuchi discloses a particular thickness of resist on the surface of the thin film capacitor relative to the depth of a recess in the thin film capacitor.

Therefore, it is respectfully submitted that, under 35 U.S.C. § 102(e), independent claim 1 recites subject matter which is allowable over that described in Kikuchi.

Each of claims 3, 11, 12, and 21 is allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Withdrawal of the 35 U.S.C. § 102(e) rejections of each of claims 1, 3, 11, 12, and 21 is respectfully requested, as is the allowance of these claims.

Rejections under 35 U.S.C. § 103(a)

Claim 4 stands rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Kikuchi, in view of teachings from U.S. Patent 5,663,090 to Dennison et al. (hereinafter "Dennison").

Claim 4 is allowable, among other reasons, as depending indirectly from claim 1, which is allowable.

Therefore, withdrawal of the 35 U.S.C. § 103(a) rejections of claims 4 is respectfully requested.

Allowable Subject Matter

The allowance of claims 15, 16, 18-20, 23, 25-27, and 33 is gratefully acknowledged.

CONCLUSION

It is respectfully submitted that each of claims 1-12, 15, 16, 18-21, 23, and 25-34 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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